Disease and Pest Management in the Home Orchard

Fruit trees have been grown in home orchards for centuries. The goal of many gardeners today is to have fresh fruit from their own trees with a minimum of spraying. There are many ways to reach that goal, but we feel young fruit trees do need some annual spraying to be healthy and productive. We try to emphasize organic and least toxic methods for keeping your orchard healthy.

►Choose disease resistant fruit tree varieties when possible.
►Monitoring your orchard for bud and blossom stages is the key to good dormant spray timing.
►Monitoring your orchard for problems for problems is key to good pest management.
►Know what you are spraying for! Some sprays recommended here are proactive- trying to prevent common problems through maintenance. Beyond general maintenance (dormant) spraying, never spray without identifying the problem.
►When mixing spray solutions, always mix less than you think you will need, as disposal of the leftovers is difficult. Try spraying just water on your orchard to see how much will give you good coverage.
►Always follow the directions on the container label. If the label is missing or unreadable, contact the company for directions (most pesticide labels are available online).
►Many insect pests have natural controls in the form of beneficial insects. Avoid using broad spectrum insecticides if possible. If they are necessary, spray at dusk to limit the impact on bees and other beneficials.

Winter

Apples and Pears
Apply dormant oil, being sure to thoroughly coat the branches and trunk bark, to help control codling moth.
Peaches and Nectarines
At bud break or **stage 2** (see Blossom Chart), apply lime sulfur or Bordeaux with a spreader sticker to protect for Peach Leaf Curl. Spray every 3 weeks for a nine week period (3 sprays) or until the tree is leafed out. Resistant varieties like Frost Peach develop resistance but should be sprayed until established.
Pears (plantings less than 2 years old)
When first green shows in buds, apply copper sulfate, fixed copper, or Bordeaux to prevent *pseudomonas* infection. Asian pears are most susceptible.

Spring

Apples and Pears
- Between **stages 4-6** apply a delayed dormant spray of lime-sulfur and oil. This spray helps protect the trees against powdery mildew infections and smothers eggs and crawlers of aphids, mites, leafrollers, and scale insects.
- Between **stages 6-7** apply a spray of lime sulfur or elemental sulfur with a spreader sticker to prevent scab and powdery mildew. This spray is not necessary for varieties resistant to these diseases. *Bacillus thuringiensis* (Bt.) can be added to this spray to help control

leafroller. Bt. can also be applied separately or mixed with insecticidal soap to control leafrollers and cutworm at this time.

- At **petal fall** apply a second scab and mildew spray, using elemental sulfur with a spreader-sticker. *Bacillus thuringiensis* (Bt.) or spinosad can be added to this spray to help control leafroller. Bt. or spinosad can also be applied separately or mixed with insecticidal soap to control leafrollers and cutworms at this time.

Apricots, Peaches, Nectarines, Cherries, and Plums

- At **stage 3** apply a delayed dormant spray of copper or Bordeaux mixed with oil. Copper is effective against blossom blight and brown rot, and the oil will smother eggs and crawlers of overwintering pests.

Plums

- If black knot has been observed, spray with Sulfur, Lime-sulfur, or Bordeaux at **petal fall.**

Summer

All Fruit

- Monitor foliage for aphids, leafrollers, cutworms and other insect pests. Spray if damage is apparent. Insecticidal soap or summer oil are effective on aphids. Bt. is effective on caterpillars and leafrollers, and most effective sprayed late afternoon or on cloudy days.

Apples, Pears

- Monitor and control codling moth and apple maggot- details pages 4 and 5.

Pears and Cherries

- Monitor for pear slug (actually a sawfly larvae). Hand pick small numbers. Spray larger infestations with insecticidal soap or dust with diatomaceous earth

Plums

- Monitor for black knot infections, and prune below the knots after harvest.

Fall

Apricots, Peaches, Nectarines, Cherries, Pears and Plums

- As the trees are losing their leaves, before hard winter rains, apply copper or Bordeaux plus a spreader-sticker. This helps protect the trees against canker infections.

Pears

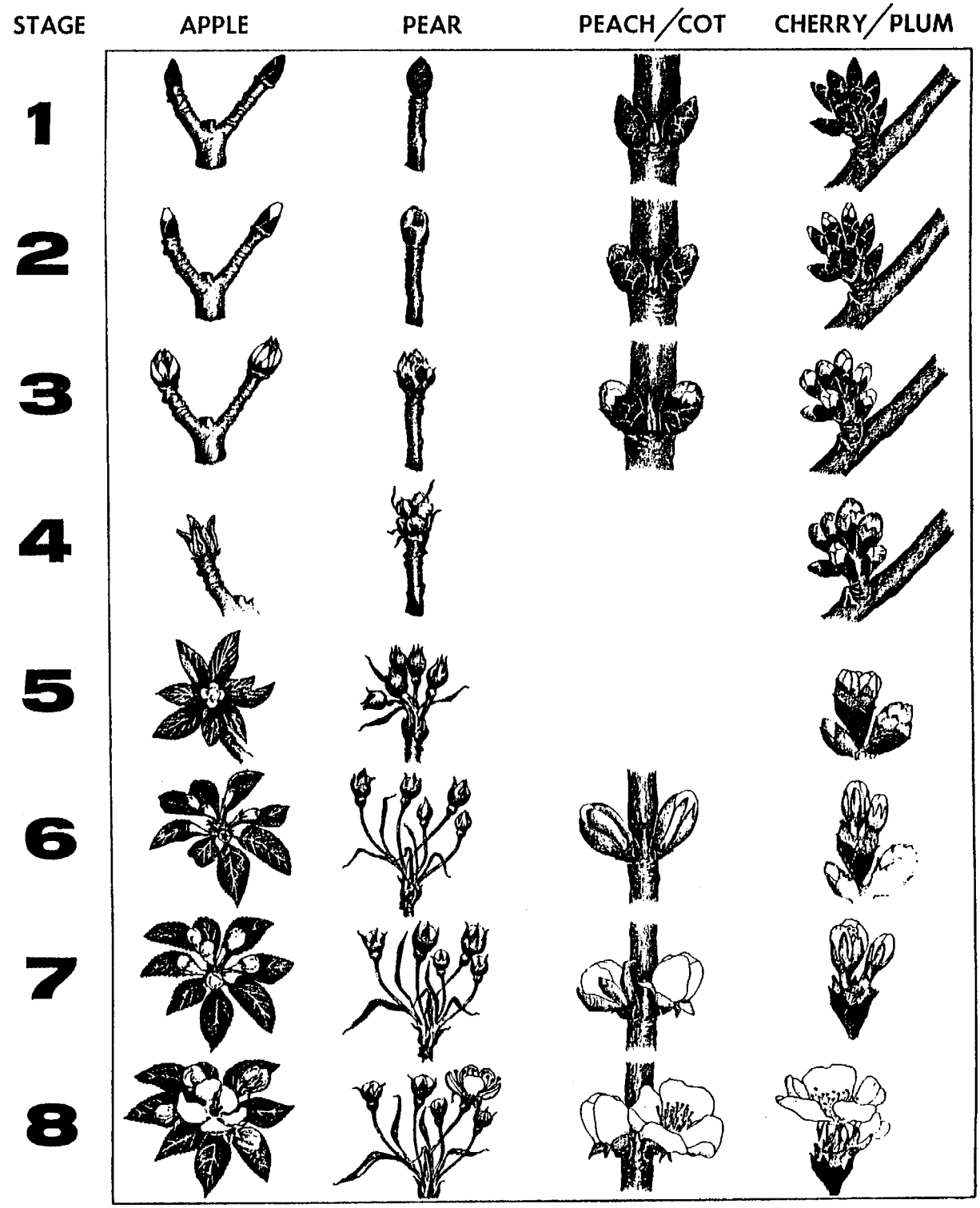
- If blister mite has been observed, spray Lime-sulfur or Oil plus Lime sulfur just after leaf drop, thoroughly covering all buds and bark.

All Fruit

- Rake up and destroy fallen leaves and fruit. If codling moth or apple maggot has been a problem, do not compost but discard the fruit.

All Year

- Prune your trees to keep them open to light and air circulation
- Keep the orchard clean, removing diseased wood, foliage, or fruit if needed.
- Keep the trees adequately watered in summer. Stressed trees are more prone to problems.
- Encourage your neighbors to keep their fruit trees healthy, too. Pests don't recognize your property boundaries!



Codling Moth

Codling Moth is a common pest of apples and pears in Western Washington. The adult moths emerge at about full bloom (of apples), mate as soon as the twilight temperatures are above 55°F, laying the first generation of eggs after mating. The eggs take 8-21 days to hatch, and the larvae immediately bore into the fruit. Larvae reach full growth in 3-4 weeks, emerge from the fruit and look for a sheltered place to spin a cocoon, at the base of the tree or beneath bark scales on the tree. Larvae may pupate in 2-3 weeks and emerge as a 2nd generation of adults, or they may remain as larvae, pupating and hatching the following spring. In our cool summer climate, there are usually 1 or 2 generations each summer; in a warm summer there may be 3 generations. Fruit that has been inhabited by codling moth larvae will have tunnels, usually to the core area. Tunneled fruit will drop early.

Management Strategies

In the home orchard, use a combination of strategies to combat codling moth.

- Sanitation in the orchard is the most important strategy. Remove infested fruit early and discard it (do not compost). You can recognize early infestation by a "sting" mark on the fruit, usually a black or brown spot, often surrounded by frass (caterpillar poop).
- Thin the young fruit so it has room to develop without touching.
- Encourage birds, bats, and beneficial insects that may prey on moths. (This includes yellow jackets and bald faced hornets.) Chickens free ranging in an orchard will help with moth control.
- If codling moth pressures are high, it may be necessary to use an insecticide. An effective, low toxicity material for controlling codling moth and other caterpillars is spinosad, made from a naturally occurring bacterium called *Saccharopolyspora spinosa*. Various trade names are Monterey Garden Insect Spray, Bulls-eye Bioinsecticide, or Green Light Spinosad Lawn & Garden Spray.
- The addition of a 1% summer oil to the spray will further enhance the effectiveness of spinosad by smothering unhatched eggs.
- Historically for Whatcom County, timing of the first spray will be late June. Try spraying around the 20th -25th of June- earlier in warm years, later in cool- and then again in 21 days. For more detailed timing of sprays look at this site from Oregon State University, http://pnwpest.org/cgi-bin/ddmodel.pl?spp=cl2&wfl=KOLM06.txt&wch=none.txt&hfl=bellingham_wa.txt.
- Another product, Last Call CM, uses a pheromone attractant and an insecticide in a resin that is applied in drops along the branches once a month starting at petal fall. The moths are attracted to the resin, try to mate with the drop, and are killed by the insecticide. No insecticide is applied to the fruit.
- A second spray option is to use a kaolin spray product (Surround) that makes the fruit unrecognizable to codling moth (and apple maggot). This product is sprayed beginning at petal fall, to thoroughly coat the trees and fruit kaolin clay. Rainy weather may require spraying every 7-10 days through mid-July or until harvest if apple maggot is a problem.
- A high labor, but effective home remedy for both codling moth and apple maggot is to bag each individual fruit after the thinning is done. Nylon footies are effective insect barriers and control both codling moth and apple maggot. Slip the developing fruit into the toe of the footie, and twist it to secure. The nylon stretches as the fruit grows. Footies are available with detail instructions through the Seattle Tree Fruit Society -

http://seattlepi.nwsource.com/nwgardens/314186_smith05.html. and through the Home Orchard Society- http://www.homeorchardsociety.org/.

Apple Maggot

Apple Maggot is becoming increasingly common in Northwest orchards. Female apple maggot flies deposit eggs singly just below the skin of an apple or other host fruit. When the female lays an egg, a small but visible puncture is made in the fruit which can lead to "dimpling." Depending on temperatures, the eggs hatch after a 3-7 day incubation period.

The tiny cream-colored larvae (maggots) feed in the fruit, passing through three growth stages. Maggots are about 3/8 inches long. The damage caused by the maggot resembles a series of brownish, irregular tunnels called railroading. The tunnels are enlarged by bacterial decay that often follows apple maggot damage. Damaged fruit eventually becomes soft and rotten and cannot be used. Early ripening varieties are most likely to be damaged.

Management Strategies

- Sanitation in the orchard is crucial. Remove all fruit with signs of maggot and dispose of it (do not compost).
- For light infestations, red sticky traps- red balls shaped like apples, or red apples from the grocer, coated with Tanglefoot and hung in the trees- help reduce the adult population.
- Physical barriers on the fruit is labor intensive but very effective. Nylon footies are effective insect barriers and control both codling moth and apple maggot. Slip the developing fruit into the toe of the footie, and twist it to secure. The nylon stretches as the fruit grows. Footies are available with detail instructions through the Seattle Tree Fruit Society - http://seattlepi.nwsource.com/nwgardens/314186_smith05.html. and through the Home Orchard Society- http://www.homeorchardsociety.org/ .
- Kaolin clay, sold as Surround, should be applied through August to provide control for apple maggot.